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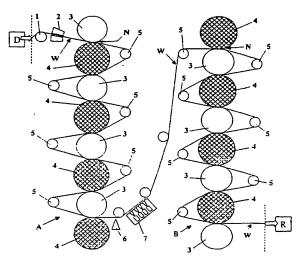
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(54) Title: METHOD FOR A MULTI-ROLL CALENDER AS WELL AS A MULTI-ROLL CALENDER



(57) Abstract: The present invention relates to a method for a multi-roll calender and to a multi-roll calender for controlling the moisture gradient of a fibrous web and for enabling the manufacture of high quality paper grades, such as WFC, LWC-roto and SC-A, by means of on- or off-line calendering. According to the invention, an on- or off-line multi-roll calender formed of separate sets of rolls (A, B) is used for calendering, and the fibrous web (W) is subjected to intermediate moistening between the sets of rolls (A, B).



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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER IPC 7 D21G1/00											
According to International Patent Classification (IPC) or to both national classification and IPC											
Minimum documentation searched (classification system followed by classification symbols) IPC 7 D21G Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal											
								C. DOCUM	ENTS CONSIDERED TO BE RELEVANT		
								Category °	Citation of document, with indication, where appropriate, of t	the relevant passages	Relevant to claim No.
								Y	US 5 669 295 A (KAYSER ET AL 23 September 1997 (1997-09-23 the whole document))	1-14
								Y	EP 0 719 891 A (VALMET CORP) 3 July 1996 (1996-07-03) the whole document		1-14
								A	US 4 370 923 A (SCHMIDT) 1 February 1983 (1983-02-01) the whole document		1-14
A	US 5 914 008 A (WINHEIM) 22 June 1999 (1999-06-22) the whole document		1-14								
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other means "P" document published prior to the international filing date but later than the priority date claimed		in the art. *8* document member of the same patent family									
Date of the actual completion of the international search Date of mailing of the international search											
	29 January 2001	13-03	13.03.01								
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INTERNATIONAL SEARCH REPORT

PCT/FI 00/00821

		PC1/F1 00/00021				
C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT						
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to daim No.				
A	US 4 935 097 A (TASHIRO ET AL) 19 June 1990 (1990-06-19) column 7, line 53 - line 55 	13				
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INTERNATIONAL SEARCH REPORT

PC1/FI 00/00821

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5669295	A	23-09-1997	DE 19508353 A AT 173776 T CA 2169979 A,C DE 59600850 D EA 960009 A EP 0732447 A JP 2612681 B JP 8246383 A KR 160398 B NO 960976 A	12-09-1996 15-12-1998 10-09-1996 07-01-1999 01-10-1996 18-09-1996 21-05-1997 24-09-1996 15-01-1999 10-09-1996
EP 0719891	Α	03-07-1996	US 5524532 A CA 2164996 A FI 956102 A,B, JP 8246379 A	11-06-1996 29-06-1996 29-06-1996 24-09-1996
US 4370923	Α	01-02-1983	DE 2823738 A FI 791427 A,B, GB 2022163 A JP 55090694 A	13-12-1979 01-12-1979 12-12-1979 09-07-1980
US 5914008	A	22-06-1999	DE 4301023 A CA 2110786 A,C DE 9320455 U EP 0609544 A FI 940102 A JP 2672256 B JP 6235187 A	21-07-1994 17-07-1994 25-08-1994 10-08-1994 17-07-1994 05-11-1997 23-08-1994
US 4935097	A	19-06-1990	DE 3687729 A DE 3687729 D DE 3687729 T EP 0217959 A WO 8604622 A	25-03-1993 25-03-1993 09-06-1993 15-04-1987 14-08-1986